

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference CRO 50664/WO	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 99/ 02796	International filing date (day/month/year) 24/08/1999	(Earliest) Priority Date (day/month/year) 28/08/1998
Applicant CROSFIELD LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☒ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/GB 99/ 02796

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1-25 (all in part)
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

See extra sheet

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Present claims 1-9 and 11-25 relate to compositions, formulations, a medium, and a method, respectively, defined inter alia by reference to the following parameters:

a retention factor (as defined herein)

a pore area of at least $25 \text{ m}^2/\text{g}$ in the pore size range of from about 20 to 50 Angstroms

the particles used are effective to reduce degradation of the biocide to such an extent that at least 60 %, preferably at least 70 % and more preferably at least 80 %, of the biocide is detectable when the biocide-containing particles are subjected to UV exposure and/or thermal ageing for 40 days under the conditions defined hereinbefore.

The use of these parameters in the present context is considered to lead to a lack of clarity within the meaning of Article 6 PCT. It is impossible to compare the parameters the applicant has chosen to employ with what is set out in the prior art. The wordings "porous inorganic carrier particles", "biocide" and "having an activated micropore system" in inter alia claim 10 are too broad. The lack of clarity is such as to render a meaningful complete search impossible. Consequently, the search has mainly been restricted to the examples.

INTERNATIONAL SEARCH REPORT

International Application No

GB 99/02796

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A01N25/08 C09D5/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01N C09D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	EP 0 922 386 A (ROHM AND HAAS CO.) 16 June 1999 (1999-06-16) the whole document ---	1-25
P,X	EP 0 832 561 A (EASTMAN KODAK CO.) 1 April 1998 (1998-04-01) page 3, line 15 -page 5, line 10; claims ---	1-25
P,X	DATABASE CAPLUS [Online] KANEBO, LTD.: "Antibacterial fungicidal polyolefin monofilaments" retrieved from CAPLUS, accession no. 1998:585771, Document no. 129:246461 XP002900717 abstract & JP 10 237716 A 8 September 1980 (1980-09-08) --- -/--	1-25

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

17 November 1999

Date of mailing of the international search report

17. 12. 1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
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Authorized officer

Gerd Strandell

INTERNATIONAL SEARCH REPORT

International Application No

T/GB 99/02796

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 93 09817 A (ROLLÉN, J.E.) 27 May 1993 (1993-05-27) claims 3-9 ---	1-25
X	DATABASE CAPLUS [Online] BIO GIKEN K.K.: "Microbicides mixed with porous materials, nonwoven fabrics, fibers, or polymers" retrieved from CAPLUS, accession no. 1992:464825, Document no. 117:64825 XP002900718 abstract & JP 04 066505 A2 March 1992 (1992-03-02) ---	1-25
A	WO 94 11302 A (JOSEPH CROSFIELD & SONS LTD.) 26 May 1994 (1994-05-26) ---	1-25
A	EP 0 353 075 A (UNILEVER PLC) 31 January 1990 (1990-01-31) claims ---	1-25
A	WO 95 31508 A (CROSSFIELD LTD.) 23 November 1995 (1995-11-23) ---	1-25
A	EP 0 112 610 A (ROHM AND HAAS CO.) 4 July 1984 (1984-07-04) page 6, line 17 -page 7, line 23; claims ---	1-25
A	EP 0 457 435 A (IMPERIAL CHEMICAL INDUSTRIES PLC) 21 November 1991 (1991-11-21) claims -----	1-25

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

T/GB 99/02796

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 922386	A	16-06-1999	AU	9515998 A	01-07-1999
			JP	11263702 A	28-09-1999

EP 832561	A	01-04-1998	AU	3158697 A	05-02-1998
			CA	2207168 A	30-01-1998
			JP	10087405 A	07-04-1998
			US	5855899 A	05-01-1999

JP 10237716	A	08-09-1998	NONE		

WO 9309817	A	27-05-1993	SE	469415 B	05-07-1993
			AU	664215 B	09-11-1995
			AU	2959092 A	15-06-1993
			BR	9206791 A	31-10-1995
			CA	2122335 A	27-05-1993
			EP	0614380 A	14-09-1994
			FI	942312 A	18-05-1994
			JP	7501243 T	09-02-1995
			MX	9206660 A	31-05-1994
			NO	941847 A	24-05-1994
			SE	9103438 A	22-05-1993
			US	5603896 A	18-02-1997

JP 04066505	A	02-03-1992	NONE		

WO 9411302	A	26-05-1994	AT	142987 T	15-10-1996
			AU	5463994 A	08-06-1994
			BR	9307447 A	01-06-1999
			DE	69304931 D	24-10-1996
			DE	69304931 T	20-02-1997
			EP	0668844 A	30-08-1995
			US	5637636 A	10-06-1997
			ZA	9308209 A	03-04-1995

EP 353075	A	31-01-1990	AU	3906889 A	01-02-1990
			JP	2255897 A	16-10-1990

WO 9531508	A	23-11-1995	AT	167507 T	15-07-1998
			AU	2308095 A	05-12-1995
			DE	69503047 D	23-07-1998
			DE	69503047 T	22-10-1998
			EP	0759959 A	05-03-1997

EP 112610	A	04-07-1984	US	4552752 A	12-11-1985
			AT	26523 T	15-05-1987
			AU	565909 B	01-10-1987
			AU	1950583 A	29-03-1984
			BR	8305074 A	08-05-1984
			CA	1223170 A	23-06-1987
			JP	1487210 C	23-03-1989
			JP	59078103 A	04-05-1984
			JP	63035603 B	15-07-1988
			MX	161451 A	27-09-1985
			US	4656057 A	07-04-1987

EP 457435	A	21-11-1991	AT	106183 T	15-06-1994
			AU	630288 B	22-10-1992
			AU	7516991 A	21-11-1991

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02796

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 457435 A		CA 2041349 A	28-10-1991
		DE 69102203 D	07-07-1994
		DK 457435 T	27-06-1994
		EP 0542721 A	19-05-1993
		ES 2056577 T	01-10-1994
		FI 912038 A,B,	28-10-1991
		IE 64991 B	20-09-1995
		JP 7069817 A	14-03-1995
		NO 179992 B	21-10-1996
		NZ 237856 A	26-05-1993
		PT 97492 A,B	31-01-1992
		US 5364874 A	15-11-1994
		US 5464851 A	07-11-1995
		CA 2041348 A	28-10-1991

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference

(if desired) (12 characters maximum)

CRO 50664/WO

Box No. I TITLE OF INVENTION

PARTICULATE CARRIER FOR BIOCIDES FORMULATIONS

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

CROSFIELD LIMITED
4 Liverpool Road
Warrington
Cheshire WA5 1AB
United Kingdom

☐ This person is also inventor.

Telephone No.

01928 511136

Facsimile No.

01928 561763

Teleprinter No.

629655 ICIMOH G

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

☐

all designated States

☒

all designated States except the United States of America

☐

the United States of America only

☐

the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

ALDCROFT, Derek
The Gables, 5 Wordsworth Way
Blueberries
Great Sutton, South Wirral
Cheshire L66 2YZ
United Kingdom

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

☐

all designated States

☐

all designated States except the United States of America

☒

the United States of America only

☐

the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒

agent

☐

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

COLLINGWOOD, Anthony Robert
Imperial Chemical Industries PLC
ICI Group Intellectual Property
PO Box 11, The Heath
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Cheshire WA7 4QE
United Kingdom

Telephone No.

01928 153723

Facsimile No.

01928 561763

Teleprinter No.

629655 ICIMOH G

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet should not be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

JONES, Helen
9 Deepdale Close
Whittle Hall
Great Sankey
Warrington
Cheshire WA5 3DG
United Kingdom

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

TURNER, Dafydd
c/o Trawscoed House
Guilsfield
Welshpool
Powys SY21 9NF
United Kingdom

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

EDGE, Michelle
30 Reedley Drive
Elmbrook
Worsley
Manchester M28 7XR
United Kingdom

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

ROBINSON, Julie
12 Fieldfare Way
Limehurst Farm
Ashton-Under-Lyne OL7 9TA
United Kingdom

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:

- ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ **AP** ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA** Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA** OAPI Patent: BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|---|---|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LR Liberia |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

- ☐
☐

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Supplemental Box If the Supplemental Box is not used, this sheet should not be included in the request.

1. If, in any of the Boxes, the space is insufficient to furnish all the information: in such case, write "Continuation of Box No. ..." [indicate the number of the Box] and furnish the information in the same manner as required according to the captions of the Box in which the space was insufficient, in particular:

- (i) if more than two persons are involved as applicants and/or inventors and no "continuation sheet" is available: in such case, write "Continuation of Box No. III" and indicate for each additional person the same type of information as required in Box No. III. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below;
- (ii) if, in Box No. II or in any of the sub-boxes of Box No. III, the indication "the States indicated in the Supplemental Box" is checked: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the applicant(s) involved and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is applicant;
- (iii) if, in Box No. II or in any of the sub-boxes of Box No. III, the inventor or the inventor/applicant is not inventor for the purposes of all designated States or for the purposes of the United States of America: in such case, write "Continuation of Box No. II" or "Continuation of Box No. III" or "Continuation of Boxes No. II and No. III" (as the case may be), indicate the name of the inventor(s) and, next to (each) such name, the State(s) (and/or, where applicable, ARIPO, Eurasian, European or OAPI patent) for the purposes of which the named person is inventor;
- (iv) if, in addition to the agent(s) indicated in Box No. IV, there are further agents: in such case, write "Continuation of Box No. IV" and indicate for each further agent the same type of information as required in Box No. IV;
- (v) if, in Box No. V, the name of any State (or OAPI) is accompanied by the indication "patent of addition," or "certificate of addition," or if, in Box No. V, the name of the United States of America is accompanied by an indication "continuation" or "continuation-in-part": in such case, write "Continuation of Box No. V" and the name of each State involved (or OAPI), and after the name of each such State (or OAPI), the number of the parent title or parent application and the date of grant of the parent title or filing of the parent application;
- (vi) if, in Box No. VI, there are more than three earlier applications whose priority is claimed: in such case, write "Continuation of Box No. VI" and indicate for each additional earlier application the same type of information as required in Box No. VI;
- (vii) if, in Box No. VI, the earlier application is an ARIPO application: in such case, write "Continuation of Box No. VI", specify the number of the item corresponding to that earlier application and indicate at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed.

2. If, with regard to the precautionary designation statement contained in Box No. V, the applicant wishes to exclude any State(s) from the scope of that statement: in such case, write "Designation(s) excluded from precautionary designation statement" and indicate the name or two-letter code of each State so excluded.

3. If the applicant claims, in respect of any designated Office, the benefits of provisions of the national law concerning non-prejudicial disclosures or exceptions to lack of novelty: in such case, write "Statement concerning non-prejudicial disclosures or exceptions to lack of novelty" and furnish that statement below.

CONTINUATION OF BOX NO III

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40 Clement Road
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This person is applicant and inventor

This person is applicant for the purpose
of the United States of America only

Country of nationality: GB
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CONTINUATION OF BOX NO IV

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Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	When earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 28 August 1998	9819778.4	GB		GB
item (2)	Jonathan Lloyd Thomas altered			
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): (1)

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):	Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):		
	Date (day/month/year)	Number	Country (or regional Office)
ISA / EP			

Box No. VIII CHECK LIST; LANGUAGE OF FILING

This international application contains the following number of sheets: request : 5 description (excluding sequence listing part) : 25 claims : 2 abstract : 1 drawings : 0 sequence listing part of description : Total number of sheets : 33	This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input checked="" type="checkbox"/> separate signed power of attorney 5 3. <input checked="" type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input type="checkbox"/> other (specify): Form 23/77
---	---

Figure of the drawings which should accompany the abstract:	Language of filing of the international application: English
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Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

ARCcollingwood

COLLINGWOOD, Anthony Robert

For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:		
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.	

For International Bureau use only
Date of receipt of the record copy by the International Bureau:

PATENT COOPERATION TREATY

CROSFIELD

11 DEC 2000

PCT

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

JACKSON, John Patrick
CROSFIELD LIMITED
Bank Quay
Warrington
Cheshire WA5 1AB
GRANDE BRETAGNE

← Letter Sent to
W.P.O 13/12/00

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing
(day/month/year) 06.12.2000

Applicant's or agent's file reference
CRO 50664/WO

IMPORTANT NOTIFICATION

International application No.
PCT/GB99/02796

International filing date (day/month/year)
24/08/1999

Priority date (day/month/year)
28/08/1998

Applicant
CROSFIELD LIMITED et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Gallego, A

Tel. +49 89 2399-8102



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference CRO 50664/WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/02796	International filing date (day/month/year) 24/08/1999	Priority date (day/month/year) 28/08/1998
International Patent Classification (IPC) or national classification and IPC A01N25/08		
Applicant CROSFIELD LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 11 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 02/03/2000	Date of completion of this report 06.12.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Krattinger, B Telephone No. +49 89 2399 8550



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PGT/GB99/02796

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1,3-25	as originally filed		
2,2a	as received on	12/09/2000	with letter of 11/09/2000

Claims, No.:

1-23	as received on	12/09/2000	with letter of 11/09/2000
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PGT/GB99/02796

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☒ the entire international application.

☐ claims Nos. .

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 1-23 are so unclear that no meaningful opinion could be formed (*specify*):
see separate sheet

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☒ no international search report has been established for the said claims Nos. 1-23.

2. A meaningful international preliminary examination report cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the standard.

☐ the computer readable form has not been furnished or does not comply with the standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 12-17
	No: Claims 1-11, 18-23
Inventive step (IS)	Yes: Claims

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PGT/GB99/02796

	No:	Claims	1-23
Industrial applicability (IA)	Yes:	Claims	1-23
	No:	Claims	

2. Citations and explanations
see separate sheet

VI. Certain documents cited

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

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Re Item I

Since the amendments in the set of claims meet the requirements of the Art. 34(2)(b) PCT, they are acceptable.

Nevertheless presently claim 11 is not clear because it refers to claim 10 which is not a particulate composition claim, but a liquid-based medium claim (Art. 6 PCT). In claim 11, the expression "in any one of claims 1 to 10" should be replaced by "in any one of claims 1 to 9".

Re Item III

Present claims relate to compositions, formulations, a medium and a method which are defined by various parameters/features :

- a. the retention factor,
- b. a pore area and a pore size range
- c. or the fact the particles are effective to reduce degradation of the biocide to such an extent that at least 60% of the biocide is detectable when the biocide-containing particles are subjected to UV exposure and / or thermal ageing for 40 days.

Parameters (a) and (c) being not commonly used in the technical field, it is impossible to compare said parameters with the disclosure of the prior art, rendering a complete search and a complete examination impossible.

Moreover, the Applicant should be aware that chemical compounds and compositions can be only exceptionally defined by parameters. They are acceptable only when the invention cannot be adequately defined by any other way, provided that those parameters are usual in the Art (Art 6 PCT; PCT Guidelines, section III-4.7a).

In the present application the retention factor is well defined. Nevertheless, the retention factor as defined in present pages 2 and 11 is not commonly used in the art to characterize a particulate composition. Only experimentation would permit to determinate the retention factor of the compositions of the prior art.

Moreover the retention factor represents actually the property which is required to perform the invention and it depends on the type of carrier (size pore, structure..) and

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/02796

biocide (size, structure..). It means that the retention factor actually represents the result to be achieved in order to perform the invention.

Therefore, the claims attempt to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features - precise choice of biocide and support - necessary for achieving this result should be added.

The same remark as above applies to feature (c) : it tends to define the subject-matter in terms of the result to be achieved which merely amounts to a statement of the underlying problem. The technical features - precise choice of biocide and support - necessary for achieving this result should be added.

Furthermore, the expressions "porous inorganic carrier particles", "biocides", "having an activated micropore system" are considered broad and render impossible to define precisely the scope of protection which is sought.

The claims should be defined in term sufficiently clear and complete for it to be carried out by a person skilled in the art (Art. 5 and 6 PCT).

Re Item V

Reference is made to the following documents:

- D1: WO 93 09817 A
- D2: Database Caplus, accession no. 1992:464825, Document no. 117:64825 & JP 04 066505 A, 1992
- D3: WO 94 11302 A
- D4: EP-A-0 353 075
- D5: WO 95 31508 A
- D6: EP-A-0 112 610
- D7: EP-A-0 457 435

Novelty

The IPEA took into accounts the comments of the Applicant.

A. In claim 1, the expression "for use as a vehicle ..." is equivalent to "suitable for" and that term is not considered as a distinguishing technical feature which has to be taken into account to judge novelty. That expression is not considered has a limiting term.

B.1. Document D1 discloses a composition comprising a porous inorganic material or binders (perlite, zeolite, bentonite, micronized silicon dioxide, cristoblaite) and a biocide - water soluble sanitation - which is adsorbed (see page 3, lines 24-35; page 4, lines 8-10, 27-30). Said composition may also comprise silicon oxide gel, gypsum, alkali silicate and aluminium silicate (page 4, lines 13-15). The biocide includes thioazolinone derivatives (page 4, lines 18-19).

The biocide composition is sprayed on the porous material, like in the present application (page 3, line 30). Moreover, D1 states that (page 7) after 7 days the treated surfaces are intact, showing that the biocide is very slowly released.

Therefore, the composition of D1 comprising the same components as in the present application and being prepared by the same or similar process, it must results into the same final particulate composition having the same physical parameters regarding the retention factor.

With what is said above, and since the parameters and broad expressions used in the claims do not permit to define clearly and non-ambiguously the scope of the invention, it is considered that the composition of D1 affects the novelty of the subject matter of claims 1-9, 11, 18-23.

Argumentation or experimental tests would be necessary to show that the process of D1 can not lead the particulate with the requisite retention factor.

2. Document D2 discloses a bactericidal and fungicidal composition comprising 5-chloro-2-methylisothiazolin-3-one and a inorganic porous carrier material such as zeolite, affecting thereby the novelty of the subject matter of claims 1-2, 4-8, 10, 11, 13, 14, 22, 23. Since document D2 states "zeolites" (sections IT) it could comprise Y-zeolite or dealuminated zeolite. Therefore it seems that the content of the Japanese application which is summarized in D2 could affect the novelty and inventive step of the entire presently claimed subject matter. When the present application enters the regional European phase, a copy of a translation in English, German or French of the document which is summarized in D2 will be required to assess novelty and inventive step.

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3. The compositions of D3 comprise amorphous silica and are used in paints and lacquers. They do not contain biocide compounds, whereas the presently claimed compositions do.
4. Document D4 discloses a liquid detergent composition comprising amorphous silicas. (BET : 200 to 550 m²/g; mean pore diameter 1,5 to 11 nm). They may eventually contain zeolite and/or conventional additives (page 3, line 25) like germicide and/or bleaches (page 2, lines 20-47; page 3, lines 21, 30, 35-37). Nothing indicates that these compounds could be adsorbed and slowly released.
5. Like the compositions of D3, the compositions of D5 comprise amorphous silica and are used in paints and lacquers. They do not contain biocide compounds, whereas the presently claimed compositions do.
6. Document D6 discloses compositions comprising microbiocides such as isothiazolones derivatives and an inorganic porous carrier in a sealed membrane. If it is clear from the example that Celite 545 would not fulfill the retention factor condition of present claim 1; but D6 mentions as possible porous carriers calcium silicate granular material, silicas, high purity silicas, charcoal, clays, vermiculite, etc. (page 12, lines 6-10; page 15, line 3-6) affecting thereby the novelty of the subject matter of claims 1-10, 18-23 (claims 1, 3, 4; page 12, lines 5-10; page 13, lines 3-25; page 14, line 23-28, examples 1, 2, 3).
7. Document D7 discloses isothiazolinone compositions. They do not contain inorganic porous carrier, whereas the presently claimed compositions do.
8. As a conclusion, it is presently considered that the content of the prior art D1 and D6 affects the novelty of claims 1-11, 18-23 (Art. 33(2) PCT).

Inventive step.

The particulate compositions of the present application being identical to the compositions of the prior art D1 and D6 and used for the same purpose - vehicle for introducing biocides in media, especially liquid-based media for D6 - the presently claimed matter does not involve an inventive step (Art. 33(3) PCT).

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The Applicant is invited to restrict the subject matter to preferred embodiments which could be considered as unambiguously novel and inventive over the disclosure of the prior art, taking into consideration the objections pointed in III and V.A and V.B.1 relating to parameters and broad wordings.

Furthermore, it seems that the content of a lot of other documents could affect the novelty and inventive step of the present application (such as US-A-4579779, US-A-4552591 which are cited in the application).

According to the examples, it appears clearly that not every inorganic porous carrier would be efficient to perform the invention, so that the Applicant, could easily restrict the subject-matter of the claim, by naming explicitly the appropriate carriers or the biocides type among other possibilities taking into account the above objections.

Re Item VI

D8: EP-A-0 922 386

D9: EP-A-0 832 561

D10: Database Caplus, accession no. 1998:585771, Document no.
129:246461 & JP 10 237716, 1980.

Certain published documents (Rule 70.10)

Application No Patent No	Publication date (day/month/year)	Filing date (day/month/year)	Priority date (valid claim) (day/month/year)
EP-A-0 922 386	16-06-99	25-11-98	11-12-97
EP-A-0 832 561	01-04-98	25-07-97	30-07-96
JP-A-10 237716	08-09-98	20-02-97	20-02-97

Document D8 as published between the filing date 24-08-99 and the priority date 28-08-98 of the present application could be part of the prior art when the present application enters the European Regional Phase if the priority rights of the present application are not valid.

D8 describes a product where the biocide is encapsulated in glass via a sol gel process and is therefore not relevant for the assessment of novelty and inventive step.

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Document D9 as filed on the 25-07-97, that is to say before the priority date of the present application which is the 28-08-98, is part of the prior art under Art. 54(3) EPC, when the present application enters the European Regional Phase for the claimed matter whose priority right are valid.

That document as published between the filing date 24-08-99 and the priority date 28-08-98 of the present application could be part of the prior art under Art. 54(2) when the present application enters the European Regional Phase for the claimed matter whose priority right are not valid.

Like D9, D8 describes a system where the biocide is encapsulated is therefore not relevant for the assessment of novelty and inventive step.

Document D10 as published between the filing date 24-08-99 and the priority date 28-08-98 of the present application could be part of the prior art when the present application enters the European Regional Phase if the priority rights of the present application are not valid.

The content of that document could request novelty and inventive step of the presently claimed matter (see abstract).

Indeed, at present the IPEA is not in possession of the priority document which is the basis of said rights.

Re Item VII

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1-D7 are not mentioned in the description, nor are these documents identified therein.

Re Item VIII

1. As mentioned in point III and V, in the set of claims, the broad expressions "inorganic carrier porous particles", "retention factor", "activated micropore system" result into claims whose scope is unclear. Moreover, the Applicant should be aware that chemical compounds can be only exceptionally defined by parameters. They are acceptable only when the invention cannot be adequately defined by any other way, provided that those parameters are usual in the Art (Art 6 PCT; PCT Guidelines, section III-4.7a).

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Furthermore, the claims attempts to define the subject matter by the result to be achieved. They should define the technical features which are required to get the appropriate properties (see point III).

2. A discrepancy appears between claim 9 and its counterpart in the description. Claim 9 defines that the particles are amorphous silicas, Y-zeolite, dealuminated Y-zeolite or mixtures thereof, whereas the description on page 3, lines 24-26 states that amorphous alumina and pseudoboehmite are also part of the invention, rendering thereby the scope of the claim obscure (Art. 6 PCT).

3. No clear support could be found in the description for the subject matter of claim 19, rendering thereby the claim obscure, since the claim should be supported by the description (Art. 6 PCT).

4. Original claims 10-13 are deleted from the present set of claim but their subject matter is added in the description on pages 2, 2a. Therefore, these embodiments do not fall within the scope of the claims. This inconsistency between the claims and the description leads to doubt concerning the matter for which protection is sought, thereby rendering the claims unclear (Article 6 PCT).

Anyway, since those embodiments concern particulate compositions which do not necessarily possess the retention factor as defined in present claims 1-9, since these type of particulate compositions are known from the prior art (D1, D2, D4 and D6), claiming these embodiments would result into an application lacking unity when entering the present application enters the European Regional Phase.

According to one aspect of the present invention there is provided a particulate composition of matter comprising porous inorganic carrier particles having biocide adsorbed within the pore system thereof and having a retention factor (as defined herein) of at least 0.6, preferably at least 0.8.

The retention factor, R , referred to above is determined from the equation $R = A/P$, where A represents the percentage active ingredient by weight remaining in the pore system after contacting with water according to the conditions defined herein and P represents the potency (Minimum Inhibition Concentration in mg of active ingredient per litre) of the biocide determined with respect to the reference microorganism *Aureobasidium pullulans* using the procedure defined herein.

The usefulness of the inorganic carrier particle will depend on the particular biocide being used, its effectiveness at various activity levels and the quantity of biocide (active ingredient) adsorbed and retained in the pore system. The amount of biocide deemed to be effective in the pore system will depend on the potency of the biocide, that is, the minimum concentration of active ingredient to prevent microbial or fungal growth. For the purposes of the present invention, the reference microorganism is *Aureobasidium pullulans*. Commonly used biocides are 2-Octyl-4-Isothiazolin-3-one (OIT) and a blend of 2-Methyl-4-Isothiazolin-3-one (MIT) and 5-Chloro-2-Methyl-4-Isothiazolin-3-one (CIT), known as (CIT/MIT). For these biocides, the Minimum Inhibition Concentration (MIC) is 36 and 5 mg of active ingredient per litre for OIT and CIT/MIT respectively.

Prior to contact with liquid media into which the particles are to be introduced, the particles preferably carry at least 30% by weight of biocide in aqueous solution or water/organic solution.

Such particles will usually be chemically inert with respect to the liquid media into which they are introduced.

A feature of the invention is the ability of the particles, when formulated into solvent or aqueous based compositions, to retain the biocide within the pore system thereof to such an extent that release of the biocide into the liquid media is sufficiently retarded in order to provide an extended period of biocidal, e.g. bactericidal and/or fungicidal, activity.

Preferably the inorganic particles have an activated micropore system. Under the IUPC system, a micropore is one having a diameter of no more than 30 AU, activation usually being achieved by thermal treatment. Whilst not wishing to be bound by theory it is thought that the carriers that contain an activated micropore system are capable of adsorbing the biocide molecules in preference to water and other substrate molecules. The invention therefore encompasses a particulate composition of matter comprising porous inorganic carrier particles having biocide adsorbed within the pore system thereof, the carrier particles having an activated micropore system.

In order to secure appropriate retention of biocide, a preferred inorganic carrier particle has a pore area of at least $25 \text{ m}^2/\text{g}$, preferably at least $30 \text{ m}^2/\text{g}$, more preferably at least $40 \text{ m}^2/\text{g}$, and up to about $300 \text{ m}^2/\text{g}$, e.g. $50 \text{ m}^2/\text{g}$ to $250 \text{ m}^2/\text{g}$, in the pore size range of from about 20 to about 50 Angstroms, and a BET surface area of at least $200 \text{ m}^2/\text{g}$ and more preferably at least $300 \text{ m}^2/\text{g}$, typically $350 \text{ m}^2/\text{g}$ to $1200 \text{ m}^2/\text{g}$. The invention therefore also encompasses a particulate composition of matter comprising porous inorganic carrier particles having biocide adsorbed within the pore

system thereof, the carrier particles having a pore area of at least $25 \text{ m}^2/\text{g}$ in the pore size range of from about 20 to about 50 Angstroms, preferably with a BET surface area of at least $200 \text{ m}^2/\text{g}$.

The weight mean particle size of the inorganic carrier particles employed in the various aspects of the present invention is less than 50 microns, more usually less than 40 microns, and typically within the range of 1 to 30 microns.

2a

AMENDED SHEET

12-09-2000

CLAIMS

1. A particulate composition of matter for use as a vehicle for introducing biocides into liquid-based media comprising porous inorganic carrier particles having biocide adsorbed within the pore system thereof and having a retention factor (as defined herein) of at least 0.6.
2. A composition as claimed in claim 1 in which the retention factor is at least 0.8.
3. A composition as claimed in claim 1 or 2 in which the particles carry at least 30% by weight of biocide solution.
4. A composition as claimed in any one of claims 1 to 3 in which the particles have an activated micropore system.
5. A composition as claimed in any one of claims 1 to 4 in which the particles have a pore area of at least 25 m²/g in the pore size range of from about 20 to about 50 Angstroms.
6. A composition as claimed in any one of claims 1 to 5 in which the particles have a BET surface area of at least 200 m²/g
7. A composition as claimed in any one of claims 1 to 5 in which the particles have a BET surface area of at least 300 m²/g.
8. A composition as claimed in any one of claims 1 to 7 in which the particles have a biocide adsorption capacity of at least 10% by weight.
9. A composition as claimed in any one of claims 1 to 8 in which the particles are constituted by amorphous silicas, Y-zeolites or dealuminated Y-zeolites, or a mixture of two or more of these materials.
10. A liquid-based medium incorporating a particulate composition as claimed in any one of claims 1 to 9.
11. A surface coating formulation incorporating the particulate composition as claimed in any one of claims 1 to 10.
12. A formulation as claimed in claim 11 in the form of a paint or lacquer.
13. A formulation as claimed in claim 11 in the form of a water-based or organic solvent-based paint.
14. A surface cleaning formulation incorporating the particulate composition as claimed in any one of claims 1 to 9.
15. A sealant formulation incorporating the particulate composition as claimed in any one of claims 1 to 9.
16. A tiling, grouting or cement-based formulation incorporating the particulate composition as claimed in any one of claims 1 to 9.
17. A mud drilling formulation incorporating the particulate composition as claimed in any one of claims 1 to 9.

18. A method of producing a biocidally-protected formulation comprising one or more components and a biocide, in which the biocide is introduced into the formulation by means of a particulate composition as claimed in any one of Claims 1 to 9.
19. A method as claimed in claim 18 in which the biocide is an isothiazolone or derivative thereof or a mixture of isothiazolones and/or derivatives thereof.
20. A method as claimed in claim 18 or 19 in which the particles used are effective to reduce degradation of the biocide to such an extent that at least 60% of the biocide is detectable when the biocide-containing particles are subjected to UV exposure and/or thermal ageing for 40 days under the conditions defined hereinbefore.
21. A method as claimed in any one of claims 18 to 20 in which the particles used are effective to reduce degradation of the biocide to such an extent that at least 80% of the biocide is detectable when the biocide-containing particles are subjected to UV exposure and/or thermal ageing for 40 days under the conditions defined hereinbefore.
22. A method as claimed in any one of claims 18 to 21 in which the biocide comprises 2-n-octyl-4-isothiazolin-3-one.
23. A method as claimed in any one of claims 19 to 21 in which the biocide comprises 2-methyl-4-isothiazolin-3-one and 5-chloro-2-methyl-4-isothiazolin-3-one.